Anesthesia Hemodynamic Monitoring

Planning well in order to help our anesthesia care providers and their patients in a more efficient manner

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Objectives

► Identify the components of an invasive monitoring system.
► Describe the equipment required for insertion of hemodynamic devices.
► Discuss Technician responsibilities during insertion of these invasive lines

Clinical Monitors

► Noninvasive
  Monitor is applied to the skin, as exemplified by electrocardiograph electrodes, blood pressure cuffs, "T" lines, Visiport, and femoral
  line catheters.
► Minimally invasive
  Requires breaking the skin, but only for local application of catheters such as microcannula catheters placed at the back of the hand or the crook
  of the elbow, or abrasion of the skin, (e.g., for placement of cutaneous
  oxygen electrodes).
► Penetrating
  Requires insertion of a probe into a bodily orifice such as the mouth, bladder, or anus, as is done for the placement of esophageal
  stethoscopes, temperature probes, and catheters.
► Invasive
  Requires cannulation of an artery or central vein.
► Highly invasive
  Cannulation of a ventricle of the brain or heart, as is done with intracranial pressure monitors or pulmonary artery catheters.

Agenda

► Transducers
► Arterial Lines
► Central Lines
► Pulmonary Artery Catheter
  (Swan-Ganz Catheter)
► Other Topics

The Why

► Why monitor blood pressure?
► Why non-invasively or invasively?
► What's the difference?

It's all about the O₂s

► Monitoring of Oxygen delivery is one of the main reasons to place invasive lines
► One of the main functions of blood is to deliver Oxygen to tissues in the body
► Capacity to deliver oxygen to all tissues is vital to the patient's well being
► Pressures tell where the blood is going and not going at any given moment
► It also affects what comes out. CO₂ and urine production are directly linked to cardiac output and circulation.
SCIP Measures and Infection Control

- **NPSG.07.04.01**
- It’s purpose is to:
- Implement evidence-based practices to prevent central line-associated bloodstream infections.
- Note: This requirement covers short- and long-term central venous catheters and peripherally inserted central catheter (PICC) lines.

Transducers

- Hemodynamic monitor
- Central line tray
- For Swan-Ganz
  - Introducer 8.5/9.0 Fr and PA Catheter 7.0 / 7.5 Fr (most common sizes)
- Pressure monitoring kit with transducer for each line
- Cable for each transducer

Insertion Equipment
Indications for Arterial Cannulation

- Code Blue
- Perioperative monitoring
- Major procedures
- Hemodynamically unstable patients
- Monitor vasopressor or vasodilator therapy
- IABP
- Intracranial pressure monitoring
- Hypertensive / Hypotensive crisis
- ABG monitoring

Ideal Radial Artery Placement

Position and Approach

- Release Thumb if hyper extended
- Nerve damage will occur if not released
- Do NOT over Tape
- Tape so that vessels are not occluded and allow free flow

Securing an Arterial Line
Different Approaches to C.V. Catheter Placement into I.J.

Insertion Sites
- Jugular
- Subclavian
- Femoral
- Antecubital

Anatomy Review
ECG morphology as it relates to Central Line morphology

A Swan-Ganz Catheter

Pulmonary Catheter Placement
Effects and Complications

- Arrhythmias
- Bacteremia
- Disconnection hemorrhage
- Embolism
- Local hematoma
- Nerve damage
- Pain
- Pulmonary artery rupture
- Pulmonary infarction
- Sepsis
- Valve damage
- Vascular thrombosis

Troubleshooting

Summary

- Can you identify the needed supplies?
- Is it clearer why lines are done?
- Questions?
Where to Get More Information

► Search the internet
► Mosby Electronic Library
► Ask your Anesthesia Care Provider
► The only dumb question is the one that is not made.